

Montana, southwestern Utah, and northeastern Wisconsin, twenty inches; and in western Maine, northeastern Massachusetts, southern and central New Hampshire and Vermont, west-central New Jersey, central and east-central New York, eastern Oregon, northeastern South Dakota, north-central Iowa, and east-central Arizona, ten inches. In the Sierra Nevada Mountains the railroads were blockaded for several days by snow, which drifted to a depth of eighteen to twenty-six feet, and in some of the canyons of Ormsby, Washoe, Lander, and Humboldt counties, Nevada, snow was reported packed in depths from twenty to over one hundred feet.

Heavy and continuous rains caused destructive floods in California, Arizona, and southern Nevada. Rivers overflowed their banks, levees broke, and great damage was done to public, railroad, and private property. At Sacramento, on the 12th, the Sacramento River was higher than ever before reported at that place.

The severest storms of the month attended the passage of a low pressure storm from northern Minnesota south of east to the middle Saint Lawrence valley and New England during the 25th and 26th. On the night of the 25th heavy gales, with

rain and snow, prevailed over the Lake region; on the 26th heavy gales continued over the Lake region and on the Atlantic coast north of Hatteras, N. C.; and on the 27th high winds prevailed on the New England coast. Over the middle and western Atlantic Ocean there was an unusual prevalence of severe storms, while over and near the British Isles generally settled weather prevailed.

An unusual and remarkable feature for December was the numerous icebergs reported near the Banks of Newfoundland, where at this season Arctic ice is rarely encountered. Navigation generally closed for the season on Lake Michigan and Lake Superior, and navigation on the Missouri and upper Mississippi rivers was interrupted by ice. Owing to an ice gorge above Davenport, Iowa, the stage of the water in the Mississippi River at that place was the lowest ever noted. Damaging drought was reported in Georgia, North Carolina, eastern Florida, eastern Mississippi, southern Louisiana, and central Iowa. Well-defined auroral displays were reported at Fort Buford, N. Dak., on the 13th; at Hartford, Conn., on the 15th; at Fort Buford, N. Dak., and Leaf River, Ill., on the 26th; and at Fort Maginnis, Mont., on the 27th.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for December, 1889, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart ii by isobars. The difference between the mean pressure for December obtained from observations taken twice daily at the hours named and that determined from hourly observations, varied at the stations named below, as follows: At Boston, Mass., New York City, Philadelphia, Pa., Washington City, Savannah, Ga., Chicago, Ill., Saint Louis, Mo., and Denver, Colo., the mean of the 8 a. m. and 8 p. m. observations was higher by .014, .019, .010, .009, .013, .001, .004, and .002, respectively, than the true mean pressure.

For December, 1889, the mean pressure was highest over the south Atlantic and east Gulf states and northern Florida, where it rose above 30.25, the highest mean reading, 30.28, being noted at Augusta, Ga., and Jacksonville, Fla., respectively. From this region northward and northwestward there was a gradual decrease in mean pressure to the northern border of the country, where the mean values generally fell below 30.00 east of the one hundred and fifteenth meridian, and where, on the extreme north Pacific coast, they were below 29.85. From the lower valley of the Columbia River there was an increase in mean pressure southward to extreme southern California, where the mean readings were above 30.05. A mean reading of 29.93 at Keeler, Cal., indicated a small area of comparatively low mean pressure in southwestern Nevada and the adjoining part of California.

A comparison of the pressure chart for December, 1889, with that of the preceding month shows that there was an increase in pressure east of a line traced from Michigan southwestward to eastern Texas, and that west of this line there was a general decrease in pressure. The most marked increase in mean pressure occurred in the south Atlantic and east Gulf states, where the mean readings were more than .10 higher than for the preceding month, and the greatest decrease in mean pressure occurred over the eastern part of the middle plateau region, where the mean values were more than .30 lower than for November, 1889. For November, 1889, the area of highest mean pressure occupied an area extending from Colorado northward to southern Idaho, within which the values rose above 30.25, and the mean pressure was lowest in the lower Saint Lawrence valley and in north-central Ontario, where the readings were below 30.00. For the current month the readings within the area of highest mean pressure over the southeastern part of the country corresponded closely with the

highest mean values of the preceding month, noted over the middle plateau region; while the lowest mean readings for December, 1889, noted on the north Pacific coast, were about .15 lower than the lowest mean values for the preceding month, noted in Canada east of the eightieth meridian.

The mean pressure for December, 1889, was above the normal east of a line traced from the eastern extremity of Lake Superior southwestward to central Texas, while to the westward of this line the mean pressure was below the normal, except over the southeastern part of the southern plateau region. The greatest departures above the normal pressure occurred along the south Atlantic and Florida coasts, where they exceeded .10, and the most marked departures below the normal pressure were noted within an area extending from northern Nevada to and along the north Pacific coast, where they were more than .15. The abnormal distribution of mean pressure for the month is referred to in connection with the unprecedentedly high temperature for December, 1889, over the country east of the Rocky Mountains, in a discussion which appears under "Temperature of the air," in this issue of the REVIEW.

BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are shown in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. For December, 1889, the monthly ranges were greatest on the coast of extreme eastern New England, where they exceeded 2.10, whence they decreased southward to less than .20 over southern Florida, westward to less than 1.10 in the upper lake region, and the more northern stations in the upper Mississippi valley, whence they increased to more than 1.30 in the Missouri Valley, thence decreased to less than .70 over parts of the northeastern slope of the Rocky Mountains, and thence increased to more than 1.20 near the mouth of the Columbia River. On the Pacific coast the monthly ranges decreased from the Columbia Valley southward to southern California, where they were less than .50. Along the Atlantic coast the extreme monthly ranges varied from .18 at Key West, Fla., to 2.11 at Eastport, Me.; between the eighty-second and ninety-second meridians, .31 at Cedar Keys, Fla., to 1.29 at Manistee, Mich.; between the Mississippi River and the Rocky Mountains, .51 at Brownsville, Tex., to 1.31 at Concordia, Kans.; in the Rocky Mountain and plateau regions, .40 at Fort Grant, Ariz.,

to 1.01 at Walla Walla, Wash.; on the Pacific coast, .43 at San Diego, Cal., to 1.22 at Portland, Oregon.

AREAS OF HIGH PRESSURE.

Twelve areas of high pressure have been traced, of which five first appeared north of Montana or North Dakota; one was first located off the north Pacific coast; one off the middle Pacific coast; one off the south Pacific coast; one over the northern plateau region; one over the middle plateau region; one on the middle-eastern slope of the Rocky Mountains; and one in the Missouri Valley. The areas of high pressure which appeared in high latitudes generally moved south of east; those which were first located in the middle latitudes, easterly; and those which apparently developed over the more southern districts passed north of east. The areas generally reached the Atlantic coast north of the thirty-fifth parallel. Two areas of high pressure, one of which first appeared off the middle Pacific coast, and the other over the middle plateau region, moved southward over the eastern part of the Gulf of Mexico after having advanced to the middle-eastern states.

I.—This area was central in Manitoba on the 1st, where it remained, the pressure increasing, until the 2d; it passed over the Lake region on the 3d, over New England on the 4th, and Nova Scotia on the 5th. The temperature fell 16° in North Dakota on the 2d, and from 10° to 20° on the 3d from Minnesota eastward to Maine and southward to Missouri. On the 4th the cold wave extended from Maine to North Carolina. High northwest winds prevailed over the Lake region during the night of the 2d.

II.—The centre of this high area was over the Saskatchewan Valley on the 4th; it moved southeastward over Minnesota, Iowa, Indiana, Ohio, and reached the middle Atlantic coast on the 7th; it then moved northeastward to Nova Scotia. The temperature fell 10° to 14° in the Saskatchewan Valley on the 4th; the fall in temperature extended to the Missouri Valley on the 5th; there was a slight fall in the Lake region and New England on the 6th, which extended over the middle Atlantic states on the 7th. The highest wind velocity reported was forty-eight miles per hour at Nantucket, Mass., on the 6th.

III.—This area passed from the Saskatchewan Valley north of the Lake region to the Gulf of Saint Lawrence between the morning of the 8th and the night of the 10th. The temperature fell 20° to 38° in the Saskatchewan country on the 8th; the fall in temperature extended southward to Kansas, where the fall was 10° to 12° . On the 9th there was a fall of 10° to 14° in the Lake region, which extended the next day over New England. This area, while accompanied by falls in temperature of 10° to 14° , was not of sufficient intensity to reduce the temperature below the normal, except in the extreme northwest.

IV.—An area of high barometer moved eastward from the Pacific coast, and on the 10th was highest in New Mexico and north of Montana. On the 11th the pressure increased .60 of an inch in the Mississippi Valley and .50 in Minnesota and Manitoba. On the 12th the pressure in the northern part of the area decreased, and the centre of high pressure was over the south Atlantic states, where it remained until the 14th. The advance of the high area to New Mexico was accompanied by a slight fall in temperature from the Pacific coast to the Missouri Valley. On the 11th the temperature fell 20° to 26° in Missouri and Arkansas and 12° to 20° in the lower lake region and the Ohio Valley. The fall in temperature on the Atlantic coast was slight. High northwest winds prevailed over the Lake region on the 11th, and on the New England and middle Atlantic coasts on the 11th and 12th.

V.—This area appeared in the Saskatchewan country on the 12th, moved eastward to Manitoba on the 13th, and reached the Saint Lawrence Valley on the 14th. The temperature fell from Montana to Nebraska on the 12th. On the 13th there was a fall of 18° to 26° in Kansas and northern Missouri and of 8° to 12° in the Lake region. The cold wave reached the Atlantic coast on the 14th, the fall in temperature being 14° to 24° in New England and the middle Atlantic

states, with high northeast winds on the coast. The maximum velocities reported were thirty-four miles at Eastport, Me., forty-two miles at Block Island, R. I., and thirty-two miles per hour at New York City.

VI.—An area of high pressure moved eastward from the Pacific coast on the 13th, and on the 14th was central in Kansas, and on the 15th passed from the Ohio Valley to the Virginia coast. The temperature fell 12° to 20° in Kansas on the 14th; it had fallen 12° to 26° in the Ohio Valley on the morning of the 15th, and 14° to 26° in Virginia and North Carolina on the night of the same day.

VII.—This area was central in Idaho on the morning of the 16th and in northern Texas on the 17th. The temperature fell 16° to 18° in the Missouri Valley and 20° to 26° in Kansas and northern Texas on the 17th.

VIII.—The night map of the 18th showed two areas of high barometer, one central off the Pacific coast and the other north of Montana, separated by a trough of low pressure which extended from Idaho to New Mexico. These two areas, though part of the same wave of increasing pressure, remained separated until the morning of the 21st, when they joined in the lower lake region. The centre then moved to the northeast, and was over the Gulf of Saint Lawrence on the 22d. The temperature fell 24° to 42° in North Dakota and northern Minnesota on the 18th. The cold wave extended over the upper lake region, and southward to Missouri and Kansas on the 19th. It moved over the Ohio Valley on the 20th, and reached the Atlantic coast on the 21st, the temperature falling 12° to 18° from Maine to Virginia. High northwest winds prevailed over the lower lake region on the 20th.

IX.—This area was central on the California coast on the 20th, in Kansas on the 21st, in the Ohio Valley on the 22d, on the North Carolina coast on the 23d, and then moved slowly southward to Florida, where it was central on the 25th. The morning map of the 23d showed a fall of 16° to 28° in the Ohio Valley, and the night map of the same date a fall of 12° to 20° in the middle Atlantic states. High northwest winds were reported from the lower lake region on the 22d.

X.—This area was central in Nebraska on the 26th and in Kansas on the 27th. The temperature had fallen 12° to 24° in Nebraska and South Dakota on the morning of the 26th, and 16° to 30° in the lower lake region and the Ohio Valley on the morning of the 27th, and 10° to 16° in New England and the middle Atlantic states for the night of the same date. The falls in temperature accompanied the recovery of pressure that followed the passage of low area xiii, and were not directly connected with the position of the centre of highest pressure.

XI.—This area moved from the north Pacific coast, where it was central on the 28th, to the Missouri valley, and thence eastward over the Lake region to Nova Scotia, where it was central on the 31st. The cold wave accompanying it extended from Manitoba, where the temperature had fallen 44° on the morning of the 29th, southward to Missouri, where the temperature had fallen 22° to 32° . It moved over the Lake region and Ohio Valley, causing a fall in temperature of 30° to 40° by the morning of the 30th. The night map of the 30th showed a fall of 20° to 30° in the middle Atlantic states. On the last day of the month there was a fall of 12° to 20° in the south Atlantic states.

AREAS OF LOW PRESSURE.

Fifteen areas of low pressure have been traced, all of which were first located east of the one-hundred and fifteenth meridian, and the low areas traced, with one exception, developed north of the fortieth parallel. The areas of low pressure traced for the current month numbered about five more than the average number traced for the corresponding month of the last sixteen years; they pursued abnormally northern paths; and but two low pressure areas passed off the Atlantic coast, south of the Canadian Maritime Provinces, one of which advanced over New England and the other over New Jersey.

The apparent connection between the unusual number and

course of areas of low pressure, and the unprecedentedly high temperature for December over the middle-eastern and south-eastern part of the country is referred to under "Temperature of the air."

I.—This area was of slight intensity and was not accompanied by precipitation. It passed from northern Minnesota to the Saint Lawrence Valley on the 1st. The temperature rose in advance of the centre from 10° to 20° .

II.—This low area developed in Nebraska during the night of the 1st and was central in Iowa on the morning of the 2d. It passed across the southern portion of the Lake region, and reached the Atlantic coast on the morning of the 3d. Rain and snow occurred over the Lake region on the 2d; it continued in the lower lake region on the 3d, and extended to southern New England and the northern portion of the middle Atlantic states. The morning map of the 2d showed a decided rise in temperature over all districts east of the Rocky Mountains, and a further rise occurred in the middle and south Atlantic states from the morning of the 2d to the morning of the 3d. High winds occurred over the lower lake region during the night of the 2d.

III.—This area was first located north of Montana on the 3d. It was central in North Dakota on the morning of the 4th; northeast of Lake Superior on the morning of the 5th; was in the Saint Lawrence Valley the night of the 5th; and passed over Nova Scotia on the 6th. In advance of the storm the temperature rose 10° to 14° in North and South Dakota and western Minnesota on the 3d. On the 4th the rise in temperature extended eastward over the Lake region and southward to Missouri and Kansas. General rains occurred in the upper Mississippi valley, and snow in the upper lake region. The area of general rain extended over the lower lake region to New England on the morning of the 5th. The temperature had risen 10° to 18° east of the Mississippi River, except in the south Atlantic states, the warm wave reaching these states on the 6th, when the temperature rose 8° to 16° .

IV.—This area was central in the Saskatchewan Valley on the morning of the 7th. It moved eastward north of the Lake region to the Saint Lawrence Valley, where it was central on the morning of the 9th. Light rains occurred in the upper Mississippi and Ohio valleys on the 7th, and general rains in the lower lake region and New England on the 8th, followed by clearing weather in the lower lake region during the night of the 8th, and in New England on the 9th. Brisk and high winds in advance of the storm were reported from the lakes and the New England coast. The temperature rose in all districts east of the Rocky Mountains on the 7th, and a still further rise of 10° to 20° occurred over the Lake region and the New England and middle Atlantic states on the 8th, the temperature in these districts reaching a point 15° to 30° above the average for the month of December.

V.—This disturbance was central in Montana on the morning of the 9th and in Iowa on the 10th. The centre reached the Saint Lawrence Valley on the 11th and passed off to the northeast during the night. On the 9th light rains occurred in Missouri and Illinois, and the temperature rose in the Missouri and upper Mississippi valleys. During the 10th the rain-area extended eastward to include eastern New York and western Pennsylvania, and southward to Tennessee. On this date the warm wave extended over the Lake region and thence southward to Tennessee, the temperature being 10° to 30° above the normal on the 11th. Rain fell in the lower lake region and in the New England and middle Atlantic states, and the weather cleared in the upper lake region during the night of the 10th. The warm wave reached the Atlantic coast on the morning of the 11th, the temperature ranging 13° to 19° above the normal from Florida to Maine. Brisk to high winds occurred over the Lake region on the 10th and 11th, and on the New England and middle Atlantic coasts on the 11th and 12th.

VI.—This was a very slight depression that passed during the 12th from Iowa northeastward over the upper lake region. It caused light snow in upper Michigan, and was preceded by

a slight rise in temperature in the lower lake region, the Ohio Valley, Missouri, and Arkansas on the 12th, and in eastern New York and southern New England during night of the 12th.

VII.—This low area was central in western Wyoming on the morning of the 13th, with a trough of low pressure extending southeastward to Kansas. The changes during the day left it as a slight depression central in Missouri. The barometric gradient increased somewhat as it moved into the lower lake region and thence southeastward to the New Jersey coast, and caused high winds on the southern New England coast on the 14th. Rain and snow occurred in the Lake region and snow in New York and New England on the 14th. During the 13th the temperature rose 8° to 10° in the middle and south Atlantic states and in the Ohio Valley and Tennessee, and there was a further rise of 4° to 10° in the south Atlantic states, and a fall of 18° to 22° in the middle Atlantic and New England states on the 14th.

VIII.—This depression was central in South Dakota on the 15th. The centre was in northern Illinois on the night of the 16th, where it remained until the night of the 17th. Rain fell in the Lake region on the 16th, and in New England and the middle Atlantic states on the 17th. The temperature rose during the 14th in North and South Dakota and Nebraska; a further rise occurred in these states on the 15th, and the warm wave extended eastward over the Lake region to New England and southward to include Missouri and Kansas; on the 16th it was over New England and the middle Atlantic states, the lower lake region, the Ohio Valley and Tennessee. The temperature continued to rise on the Atlantic coast during the 17th.

IX.—This low area appeared central north of Montana on the night of the 17th, at the same time low area viii was central in northern Illinois. The latter depression filled up during the night, but, with a slight interruption, the warm wave which had started in advance of it was continued and increased by this low area (number ix) on the 17th. The temperature rose in the Missouri Valley and the northwestern states and territories, and in the Mississippi Valley, and eastward to New England on the following day, except in Ohio, Indiana, and western Pennsylvania, where there had been a slight fall in temperature attending the filling up of depression number viii. On the morning of the 19th the temperature in New England was 15° to 20° above the normal for the month. Rain fell in the Lake region and the New England and middle Atlantic states on the 18th.

X.—This low area developed from a trough of low pressure that extended from Montana southward to New Mexico on the night of the 18th. On the morning of the 19th the centre was in Kansas, whence it moved to the northeastward, and on the morning of the 20th was central in the lower lake region; it reached the Gulf of Saint Lawrence on the 21st. Snow fell in the Missouri and upper Mississippi valleys on the 19th, and during the 20th the rain and snow area extended over the Lake region to New England. High winds prevailed over the Lake region during the day, and on the New England coast during the night of the 20th. On the morning of the 18th a warm wave extended from North Dakota southward over Nebraska, Kansas, and Texas; during the day it moved eastward to the Mississippi Valley; it reached the Atlantic coast on the 20th, the temperature on that day being 15° to 25° above the normal from Maine to North Carolina.

XI.—This depression was central in Montana on the 20th. Snow fell during the day in South Dakota, and the temperature rose 10° to 30° in Minnesota and North Dakota. The storm-centre moved southward to Kansas, and thence to the Lake region on the 21st, and rain fell in Illinois, and snow and rain in Wisconsin and Minnesota, and the warm wave extended over the central valleys and the upper lake region. On the 22d the warm wave reached the Atlantic coast, and rain fell in the lower lake region, the Ohio Valley, and the middle Atlantic and New England states, and high winds were reported from the Lake region and the north Atlantic coast.

XII.—This storm was central in Wyoming on the 23d; it moved eastward to southern Minnesota, thence northward to Lake Superior, and thence eastward, reaching the Gulf of Saint Lawrence on the 25th. The temperature rose 20° in Wyoming and Colorado, and the warm wave extended to the Missouri Valley on the 22d. On the 23d the rise in temperature extended eastward to the Lake region and Ohio valley. On the 24th high southeast to southwest winds, accompanied by rain, prevailed over the Lake region, and the rain-area included the New England and middle Atlantic states.

XIII.—This storm was the most severe one of the month. It appeared first in South Dakota as a depression of very moderate energy on the morning of the 25th. It moved very rapidly to the eastward, reaching the Saint Lawrence Valley the next morning, with greatly increased energy. Heavy gales, with rain and snow, prevailed over the Lake region during the night of the 25th, and the rain-area extended over the New England and middle Atlantic states and Ohio Valley. As the centre moved eastward to the Saint Lawrence Valley the depression deepened, and the barometric gradient in the rear of the storm became very steep. Heavy north-west gales prevailed on the lakes and on the Atlantic coast from Maine to Virginia on the 26th, and on the Atlantic coast with decreased violence on the 27th.

XIV.—This low area was central in northern Colorado on the 27th, and in Iowa on the 28th; it then moved northeastward over the Lake region to the Gulf of Saint Lawrence. Snow fell in Wyoming and Colorado on the 28th; the rain-area was over the Lake region, New England, and the Ohio Valley on the 29th, and extended southwestward to the Gulf States. The rains in the east Gulf states continued on the 30th, and extended into the middle Atlantic states. High northwest winds prevailed on the north Atlantic coast on the 30th. There was a general rise in temperature over the central valleys and the Lake region on the 27th, and a further rise in the same districts on the 28th. The warm wave reached the

Atlantic coast on the 28th, and there was a further rise in temperature in New England and the middle Atlantic states on the 29th.

XV.—This area was central in Montana on the night of the 30th. On the night of the last day of the month it was central in northeastern Colorado. Snow fell in Wyoming and Colorado on the 31st. A warm wave extended over North and South Dakota, Nebraska, and Kansas on the 30th; on the 31st it was over the same districts, and had extended eastward to the Lake region, and southward to the west Gulf states.

Table i exhibits some of the principal features of the areas of high and low pressure. In connection with the areas of high pressure it is shown that they were first observed in the region bounded by the thirty-third and fifty-second parallels and the ninety-eighth and one hundred and twenty-fifth meridians, and last observed from the twenty-ninth to forty-eighth parallels and the sixty-third to one hundred and first meridians; that their average duration was 2.8 days; that their average rate of progression was thirty-five miles per hour; that the maximum abnormal rises in pressure for twelve hours averaged .53 of an inch, which were accompanied by maximum abnormal falls in temperature of 19° for a corresponding period, and a maximum wind velocity averaging forty-one miles per hour.

The data relating to areas of low pressure show that they were first observed in the region bounded by the thirty-eighth and fifty-second parallels and the ninety-fifth and one hundred and thirteenth meridians, and last observed from the thirty-ninth to the fiftieth parallels and the sixty-first to the one hundred and first meridians; that their average duration was 1.7 days; that the average rate of progression of the centres was forty-two miles per hour; that the maximum abnormal falls in pressure in twelve hours averaged .42 of an inch, which were accompanied by maximum abnormal rises in temperature of 17° for a corresponding period, and a maximum wind velocity averaging thirty-five miles per hour.

TABLE I.

Barometer.	First observed.			Last observed.			Duration.	Velocity per hour.	Maximum abnormal changes in pressure in twelve hours, with maximum abnormal changes in temperature and maximum wind velocities in connection therewith.															
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.	Rise.			Station.	Date.	Fall.	Station.	Date.	Miles per hour.	Direction.	Station.	Date.							
High areas.		°	°	°	°	Days.	Miles.	Inch.																
I.....	1	50	101	44	63	3.5	24	.44	Davenport, Iowa.....	3	18	Springfield, Mo.....	3	36	n.	Green Bay, Wis.....	3							
II.....	4	52	114	48	63	3.5	36	.36	Moorhead, Minn.....	5	16	Bismarck, N. Dak.....	5	26	w.	Manistee, Mich.....	5							
III.....	8	52	112	48	65	2.5	36	.64	Port Arthur, Ont.....	9	16	Duluth, Minn.....	9	28	sw.	Duluth, Minn.....	9							
IV.....	10	37	107	29	84	4.5	23	.52	Milwaukee, Wis.....	11	20	Cairo, Ill.....	11	42	nw.	Grand Haven, Mich.....	11							
V.....	12	52	114	48	76	2.0	35	.50	Montreal, Quebec.....	13	21	Montreal, Quebec.....	13	36	nw.	Northfield, Vt.....	13							
VI.....	14	41	100	38	75	1.5	39	.32	Atlantic City, N. J.....	15	20	Lynchburgh, Va.....	15	60	nw.	Block Island, R. I.....	15							
VII.....	16	45	117	36	101	1.0	46	.28	Fort Sill, Ind. T.....	17	16	Norfolk, Va.....	17	10	nw.	Block Island, R. I.....	17							
VIII.....	18	51	116	47	64	3.5	35	.64	Oswego, N. Y.....	21	15	Abilene, Tex.....	21	28	nw.	Fort Smith, Ark.....	21							
VIII a.....	18	33	119	41	81	1.5	57	.64	Oswego, N. Y.....	21	15	Oswego, N. Y.....	21	28	nw.	Albany, N. Y.....	21							
IX.....	20	38	123	29	85	5.0	32	.64	Alpena, Mich.....	22	12	Buffalo, N. Y.....	22	72	nw.	Albany, N. Y.....	22							
X.....	26	42	98	38	101	1.0	25	.42	Buffalo, N. Y.....	26	21	Buffalo, N. Y.....	26	64	nw.	Buffalo, N. Y.....	26							
XI.....	28	48	125	46	69	3.5	36	1.08	Rockliffe, Ont.....	30	27	Rochester, N. Y.....	26	52	nw.	do.....	26							
									Rockliffe, Ont.....	30	27	Rockliffe, Ont.....	30	52	nw.	Montreal, Quebec.....	30							
Mean.....		45	112	41	77	2.8	35	.53			19		41											
Low areas.								Fall.																
I.....	1	49	99	50	66	1.0	60	.34	Eastport, Me.....	2	15	Northfield, Vt.....	1	36	sw.	Block Island, R. I.....	2							
II.....	2	42	96	42	87	0.5	42	.28	Cincinnati, Ohio.....	2	10	Indianapolis, Ind.....	2	36	s.	Springfield, Ill.....	2							
III.....	3	51	111	44	61	3.0	36	.44	Parry Sound, Ont.....	5	35	Kingston, Ont.....	5	34	w.	Buffalo, N. Y.....	5							
IV.....	7	52	110	49	67	2.0	41	.34	Kingston, Ont.....	8	12	Rochester, N. Y.....	8	32	s.	Erie, Pa.....	5							
V.....	9	47	112	46	68	2.5	38	.64	Alpena, Mich.....	10	17	Columbus, Ohio.....	10	32	e.	Port Huron, Mich.....	10							
VI.....	12	43	95	46	86	0.5	42	.36	Northfield, Vt.....	13	10	Boston, Mass.....	13	34	sw.	Block Island, R. I.....	13							
VII.....	13	43	110	39	73	1.5	58	.36	Detroit, Mich.....	14	9	Indianapolis, Ind.....	14	42	ne.	Nantucket, Mass.....	14							
VIII.....	15	43	102	41	88	1.5	24	.30	Parkersburgh, W. Va.....	16	23	Parkersburgh, W. Va.....	16	8	s.	Parkersburgh, W. Va.....	16							
IX.....	17	52	108	47	77	1.5	40	.36	Bismarck, N. Dak.....	17	17	Fort Sully, S. Dak.....	17	12	s.	Rapid City, S. Dak.....	17							
X.....	19	38	99	48	65	2.0	41	.30	Cleveland, Ohio.....	20	14	Cleveland, Ohio.....	20	28	ne.	Chicago, Ill.....	20							
XI.....	20	42	108	47	73	2.5	39	.66	Parry Sound, Ont.....	22	16	Erie, Pa.....	22	48	w.	Buffalo, N. Y.....	22							
XII.....	23	43	107	48	64	2.0	46	.56	Marquette, Mich.....	24	17	Detroit, Mich.....	24	34	sw.	Marquette, Mich.....	24							
XIII.....	25	46	103	45	67	1.5	50	.70	Kingston, Ont.....	26	13	Rochester, N. Y.....	26	56	w.	Port Huron, Mich.....	26							
XIV.....	27	41	104	48	65	2.5	33	.68	Montreal, Quebec.....	29	28	Montreal, Quebec.....	29	40	s.	Montreal, Quebec.....	29							
XV.....	30	47	113	41	103	1.0	37	.46	Montrose, Colo.....	31	14	Springfield, Mo.....	31	56	s.	Dodge City, Kans.....	31							
Mean.....		45	105	45	74	1.7	42	.45			17		35											

NORTH ATLANTIC STORMS FOR DECEMBER, 1889 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during December, 1889, are shown on chart i. These paths have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Thirteen depressions have been traced for December, 1889, the average number traced for the corresponding month of the last six years being 9.8. The greatest number of depressions previously traced for December was thirteen, in 1887, and the least number was seven, in 1884. Of the depressions traced for the current month seven advanced eastward over or near Newfoundland; one moved eastward off the middle Atlantic coast; three first appeared over mid-ocean; and two apparently developed to the eastward of Bermuda. The average path of the depressions was east-northeast until the fortieth meridian was reached when they passed northward or northeastward beyond the region of observation. Over the western portion of the ocean the severest storms of the month occurred on the 5th, when gales of hurricane force and pressure falling below 29.50 (749) were reported east of Bermuda, and on the 12th and 15th, when gales of hurricane force and pressure falling to, or below, 29.00 (737) were reported over, and near, the Banks of Newfoundland. Over mid-ocean gales of hurricane force were reported on the 1st, 13th to 16th, and 24th, and pressure falling below 28.80 (732) was noted on the 16th. Over and near the British Isles the pressure continued high until the 8th; was low from the 9th to 14th, falling to 29.02 (737) at Leith, Scotland, on the 10th; was high from the 15th to 17th; low from the 18th to 24th; and during the balance of the month continued high, except on the 31st, when there was a marked decrease in pressure.

The movements of areas of high pressure over the north Atlantic Ocean during the month were as follows: On the 1st an area of high pressure extended from the Azores westward to the American coast south of Nova Scotia. By the 2d this area had apparently contracted to the westward and southward, and by the 3d had disappeared by a decrease in pressure. During the 4th and 5th the centre of an area of high pressure moved eastward over New England and Nova Scotia and by the 6th united with an area of high pressure which occupied the ocean east of the thirtieth meridian on the preceding date. This area of high pressure continued nearly stationary during the 6th and 7th, on which latter date an area of high pressure moved off the south Atlantic coast, and by the 8th these areas had apparently united, and the pressure was high south of the fiftieth meridian from coast to coast. During the 9th and 10th the pressure decreased over the eastern part of the ocean, and the pressure continued high along the American coast until the 11th, after which the western limit of the area contracted southeastward, and on the 12th the pressure was high over and near the Azores, and an area of high pressure which had advanced eastward over the American continent was central over the south Atlantic states, whence it gradually settled southward over the Gulf of Mexico by the night of the 14th. On the 16th an area of high pressure moved off the American coast and thence eastward, and united with an area of high pressure which occupied the ocean from the British Isles southwest to the Azores. During the 17th and 18th the pressure was high over the entire ocean south of the fiftieth parallel, and during the 19th and 20th the western limit of this area of high pressure contracted southeastward to the Azores. During the 22d an area of high pressure moved eastward over the Canadian Maritime Provinces and thence advanced southeast to the Azores by the 23d, on which latter date an area of high pressure moved off the middle and south Atlantic coasts, and thence slowly eastward to the Azores by the 26th. During the 29th an area of high pressure moved eastward over the Canadian Maritime Provinces and thence southeastward, and at the

close of the month the pressure was high from the twentieth meridian south of the fiftieth parallel to the American coast.

The most notable December storms of tropical or sub-tropical origin noted in the MONTHLY WEATHER REVIEW for preceding years occurred in 1887, when three storms of marked strength appeared in that region. On December 1, 1887, a storm was central about midway between Bermuda and the Windward Islands, whence it moved irregularly northward to the Banks of Newfoundland by the 6th, attended by heavy gales. On the 4th a depression was central east of the Windward Islands, whence it moved northeast and recurved to the northeastward north of the Windward Islands on the 5th. This storm, together with the depression which preceded it, was attended by a heavy "norther" over the West Indies during the first four days of the month, during which many vessels were wrecked. On the 4th, during a violent gale, an immense wave struck the beach at Baracoa, Cuba, broke and flowed inland, destroying nearly three hundred houses and huts without, however, an attendant loss of life. Heavy gales attended the passage of this depression over the ocean during the 6th and 7th. From the 7th to 12th a depression was given a probable track westward over the Caribbean Sea. During the 7th and 8th a heavy "norther," evidently occasioned by this depression, swept over the West Indies, causing much damage to shipping. Probably the most important storm noted for December over the eastern north Atlantic Ocean and the British Isles occurred in 1886. This storm was central south of Nova Scotia on the 2d, and moved thence to the British Isles by the 8th, on which latter date it was central near Aberdeen, Scotland. The fall of the barometer over England was probably without a parallel in the history of that country, the barometric minimum reported being 27.45 (697) at Orme's Head, and a reading of 27.48 (698) was noted at Liverpool. At Leith, Scotland, the barometer fell with great rapidity during the day, reaching 27.65 (702) at 19 hours 30 minutes. This was reported as being by far the lowest barometer reading that occurred at Leith since January 26, 1884, on which date the lowest reading ever made at that place, 27.45 (697), was recorded at 10 p. m.

Compared with the corresponding month of the last six years the weather over the north Atlantic during December, 1889, was unusually stormy over the middle and western parts of the ocean, where the storms, although not equalling in severity some of the more notable December storms of preceding years, were of more frequent occurrence along the trans-Atlantic steamship routes. No storms traversed the ocean from coast to coast, which fact may be attributed to the abnormally high pressure which prevailed over and near the British Isles, where the pressure was nearly two-tenths of an inch above the normal for the month, and whereby the storms were apparently deflected to the northeastward between the twentieth and fortieth parallels.

The following are brief descriptions of the depressions traced for December, 1889:

1.—This depression was central over mid-ocean on the 1st, with pressure below 29.40 (747) and strong to whole gales. By the 2d this depression had advanced east-northeast to the twentieth meridian, without an appreciable loss of energy, after which it disappeared north of the region of observation.

2.—This depression moved eastward over northern Newfoundland and on the 3d was central northeast of Newfoundland, with pressure below 29.20 (742) and strong to whole gales. By the 4th the depression had moved northeast to the thirty-fifth meridian, after which it passed north of the region of observation.

3.—This depression appeared on the 4th south of the Banks of Newfoundland, and had moved slowly eastward by the 5th, attended by fresh to strong gales, after which it probably recurved westward and united with number 4 which had advanced from the southward.

4.—This depression apparently developed east or southeast of Bermuda, where it was central on the 5th, with pressure below 29.50 (749) and gales of hurricane force; moving north-northeast, the depression apparently united with number 5 near Newfoundland after the 6th.

5.—This depression was a continuation of low area iii, which passed southeast over Nova Scotia during the 6th, and thence moved to the north of Newfoundland by the 7th, after which it disappeared north of the region of observation without evidence of marked energy.

6.—This depression moved northeast over mid-ocean north of the fiftieth parallel during the 11th and 12th, with strong to whole gales, and pressure 29.00 (737) on the latter-named date, after which it moved north of the region of observation.

7.—This depression was a continuation of low area v, which was central over New Brunswick the evening of the 11th. From the 12th to 15th the depression moved northeast to the thirtieth meridian, attended by pressure falling to, or below, 29.00 (737) and gales of hurricane force.

8.—This depression was a continuation of low area vii, which moved off the middle Atlantic coast during the 14th, and on the 15th the depression was central about midway between the Grand Banks and Bermuda. On this date gales of hurricane force were reported south of the Banks of Newfoundland, after which the centre of depression apparently moved northeastward, and number 9 was possibly its continuation.

9.—This depression was central over mid-ocean north of the fiftieth parallel on the 16th, with reported barometer readings below 28.80 (732) and gales of hurricane force over a considerable area, after which it disappeared north of the region of observation. While it is possible that this depression was a continuation of number 8, reports at hand will not permit the connection of the paths.

10.—This depression was central northeast of Newfoundland on the 20th, whence it had apparently advanced from the Labrador coast. By the 21st the storm-centre had moved east-northeast to the thirtieth meridian, attended by fresh to strong gales, after which it apparently passed north of the British Isles.

11.—This depression was a continuation of low area x, which moved over the Canadian Maritime Provinces during the 21st. By the 22d the depression had advanced east-northeast to the fortieth meridian, attended by fresh to strong gales, after which it passed northeastward north of the region of observation.

12.—This depression was a continuation of low area xi, which moved eastward over the Canadian Maritime Provinces, and on the morning of the 23d was central southeast of Nova Scotia, in which position the storm showed small energy. By the 24th the storm-centre had passed rapidly east-northeast to the fortieth meridian, with pressure falling below 29.00 (737), and gales of hurricane force. During the 25th and 26th the centre of depression advanced south of east to about the twenty-seventh meridian with a marked loss of strength, after which it moved northeastward beyond the region of observation.

13.—This depression was a continuation of low area xiii, which moved eastward over the Saint Lawrence Valley and Nova Scotia during the 26th, with pressure falling below 28.80 (732). On the morning of the 27th the depression was central near Cape Breton Island, Gulf of Saint Lawrence, with pressure falling to 28.76 (730) at Sydney, and strong to whole gales west of the fortieth meridian. By the 28th the storm-centre had moved east-northeast to the fiftieth parallel, with an apparent loss of energy, after which it disappeared north of the region of observation.

OCEAN ICE IN DECEMBER.

The icebergs noted for the current month far exceeded in number those reported for any December during the last seven years. In December, 1889, they were encountered most frequently along the northeast edge of the Banks of Newfoundland, where they were observed on the 6th to 8th, 12th, 13th, 19th, 22d to 24th, 27th, 29th, and 30th, while off the southeast extremity of Newfoundland they were reported on the 6th,

25th, 27th, and 30th. In the corresponding month of 1882, 1883, 1884, 1886, and 1888 no Arctic ice was reported near Newfoundland and the Grand Banks; in 1885 several icebergs were observed off the Newfoundland coast during the latter part of the month, and in 1887 a small iceberg was reported in N. 46° 10', W. 47° 28', on the 26th, and a small iceberg in N. 48° 20', W. 48° 40', on the 28th. This statement shows that since, and including, 1882 there have been but two years in which Arctic ice has been reported for December. The southward drift of numerous icebergs during December, 1889, was, therefore, an unusual and remarkable feature, and indicated abnormally high temperature to the northward of Newfoundland, where at this season ice is usually massed and fixed along the coasts until the higher temperature of spring causes a movement of the Arctic ice sheet along the coasts and a breaking up of the masses of field ice, which as detached bergs and field ice drift southward in the Arctic currents, aided by the prevailing winds.

The following positions of icebergs reported for December, 1889, are shown on chart i by ruled shading:

6th.—N. 48° 51', W. 46° 45', berg two hundred feet long with two pinnacles fifteen feet high, also several detached pieces; N. 48° 28', W. 47° 53', small berg; N. 47° 20', W. 51° 20', medium sized berg about forty feet high.

7th.—N. 48° 44', W. 49° 45', small berg twenty feet high.

8th.—N. 47° 54', W. 48° 13', large berg with two peaks; N. 48° 49', W. 47° 51', small berg about thirty-five feet high and about one hundred and fifty feet long.

12th.—N. 48° 21', W. 46° 20', one large berg; also N. 48° 08', W. 47° 10', one large berg and a few small ones.

13th.—N. 47° 47', W. 46° 58', iceberg about four hundred feet long.

19th.—N. 47° 14', W. 47° 21', large iceberg about one hundred and twenty to one hundred and thirty feet high.

22d.—N. 46° 58', W. 48° 00', berg about fifty feet high.

23d-24th.—N. 46° 36', W. 46° 50', large berg about one hundred feet high; N. 47° 23', W. 43° 45', large berg about sixty feet high.

25th.—N. 47° 11', W. 51° 21', large berg two hundred feet high; N. 46° 48', W. 52° 31', large berg about one hundred and sixty feet high, conical shape.

27th.—N. 48° 10', W. 47° 53', one large and three small bergs; N. 46° 50', W. 52° 20', two bergs and several small pieces, one of the bergs very large.

29th.—N. 47° 55', W. 47° 32', one berg; N. 47° 52', W. 47° 42', one berg.

30th.—N. 46° 09', W. 52° 03', a berg; N. 47° 08', W. 46° 37', one small berg.

FOG IN DECEMBER.

The following are limits of fog-areas on the north Atlantic Ocean, west of the fortieth meridian, for December, 1889, as reported by shipmasters:

Date.	Entered.			Cleared.			Date.	Entered.			Cleared.		
	Lat. N.	Lon. W.		Lat. N.	Lon. W.			Lat. N.	Lon. W.		Lat. N.	Lon. W.	
9-10	40 04	69 20		40 42	66 27		19	45 15	48 47		45 02	50 24	
9-10	42 30	67 50		42 28	68 20		19	39 00	74 11		37 30	74 31	
	43 30	59 55		43 20	60 40		19-20	44 36	59 21		44 27	60 37	
10	41 01	66 15		40 46	67 25		19-20	45 59	49 33		46 30	46 21	
10	45 02	51 18		44 40	52 51		27	47 56	48 36		47 29	49 44	
10	43 42	52 37		44 01	49 56		30	42 54	63 34		42 38	63 48	
19	Sandy Hook.												

The limits of fog-belts west of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on four dates; between the fifty-fifth and sixty-fifth meridians on four dates; and west of the sixty-fifth meridian on three dates. Compared with the corresponding month of the last two years the dates of occurrence of fog near the Grand Banks were eight less than the average; west of the fifty-fifth meridian the dates of occurrence

of fog about corresponded in number with the average of the last two years. Over and near the Grand Banks fog was reported on the 10th, with high barometer and winds mostly from the southeast; and on the 19th, 20th, and 27th, with the advance or passage to the northward of areas of low pressure. Between the fifty-fifth and fifty-sixth meridians fog was reported on the 10th, with high barometer and variable winds; and on the 19th, 20th, and 30th with the passage of areas of low pressure to the northward. West of the sixty-fifth meridian fog was reported on the 9th and 19th, with areas of low pressure central in the Saint Lawrence Valley, and on the 10th, with high pressure and variable winds. Very dense fog prevailed

at New York City, Philadelphia, and Baltimore from the 18th to 20th. At New York City, on the 20th, there were many collisions in the North and East rivers; accidents on the elevated railroads and on the bridge; ocean steamers could not leave their docks, and no vessels entered port. At Philadelphia, navigation was almost suspended on the Delaware River and in the Bay. At Baltimore, navigation was greatly interfered with; vessels were obliged to anchor, and the detention of vessels caused a loss of thousands of dollars. On these dates unsettled weather and rain prevailed, attending the passage of areas of low pressure over the Lake region and the Saint Lawrence Valley.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for December, 1889, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

For December, 1889, the mean temperature was highest over extreme southern Florida and in the lower Rio Grande valley, where it was above 70°. On the Atlantic coast south of Savannah, Ga., along the east Gulf coast, over Louisiana, southwestern Arkansas, and a greater part of the eastern half of Texas the mean values were above 60°. The mean temperature for the month was above 50° south of a line traced irregularly westward from southeastern Virginia to extreme northern Texas, and thence southwestward to south-central New Mexico; it was also above 50° south of a line traced from southeastern Arizona northwestward to San Francisco, Cal. The mean temperature was lowest in northern North Dakota, northeastern Montana, and in the British Possessions to the northward, where it fell below 10°. The mean values were below 20° in the Saint Lawrence Valley east of the seventy-second meridian, in northern and extreme western Ontario, and north of a line traced from the north shore of Lake Superior south of west to southern North Dakota, and thence north of west to the region north of extreme western Montana. The mean readings were also below 20° within a limited area in extreme west-central Montana. The mean temperature was below 30° in the upper Saint Lawrence valley, in northern New England, extreme northern New York, in the upper lake region north of the forty-fifth parallel, and north of a line traced thence westward to southwestern South Dakota, thence northwest to central Montana, thence southward to central Utah, thence northwestward to west-central Idaho, thence southwest to extreme northeastern California, and thence irregularly northward to north-central Washington. The mean readings were also below 40° within a limited area in south-central Colorado.

The mean temperature for December, 1889, was above the normal, except in the Pacific coast states, western Montana, northern Idaho, and western Nevada. Sacramento, Cal., was the only Signal Service station on the Pacific coast where the mean temperature was above the normal, and the excess at that place was but 0°.5. The most marked departures above the normal temperature occurred within an area embracing the lower Ohio valley and Tennessee, Arkansas, Missouri, and Iowa, where they generally exceeded 15°, the greatest excess, 17°.2, being reported at Cairo, Ill., and Memphis, Tenn. Along

the Pacific coast the departures below the normal temperature were less than 5°.

The following are some of the most marked departures from the normal at the older established Signal Service stations:

Above normal.		Below normal.	
Cairo, Ill., and Memphis, Tenn	17.2	Olympia, Wash	4.4
Des Moines, Iowa	15.6	San Diego, Cal	3.6
San Antonio, Tex	13.0	Red Bluff, Cal	3.2
Lynchburg, Va.	11.6	Winnemucca, Nev	2.8
Cheyenne, Wyo	8.5	Helena, Mont	1.4

THE HIGH TEMPERATURE OF DECEMBER, 1889.

The remarkable excess of temperature for December, 1889, is exhibited by the following table, which shows that at sixty-five out of a total of eighty-six Signal Service stations east of the Rocky Mountains and south of the upper lake region, and in the middle and southern plateau regions, having a record of ten years, or more, the mean temperature was the highest ever noted for December. The table also gives for the stations named the highest mean temperature previously recorded for December, with the year of occurrence; the excess of temperature for the current month over the highest previous record for December; the annual mean temperature for 1889; and the departures of the annual mean temperature for 1889 from the annual normal temperature:

Station.	Length of record.	Mean temperature, Dec., 1889.	Departure from normal.	Highest previous mean for Dec.	Year of occurrence.	Excess, Dec., 1889.	Annual mean temperature, 1889.	Departure from annual normal.
Boston, Mass.	19	38.0	+ 6.0	37.8	1881	0.2	50.7	+ 12.9
New Haven, Conn.	18	38.8	+ 7.8	38.0	1877	0.8	50.6	+ 11.8
New London, Conn.	18	40.0	+ 7.0	39.3	1881	0.7	51.3	+ 11.3
New York City	20	41.4	+ 7.4	40.7	1881	0.7	53.5	+ 12.3
Philadelphia, Pa.	19	43.6	+ 7.6	41.7	1881	1.9	54.8	+ 13.1
Atlantic City, N. J.	17	43.6	+ 7.6	42.2	1881	1.4	52.3	+ 10.6
Baltimore, Md.	18	46.0	+ 9.0	43.1	1877	2.9	55.8	+ 12.6
Washington City.	20	45.6	+ 9.6	41.8	1877	3.8	55.1	+ 13.4
Cape Henry, Va.	16	52.4	+ 9.4	51.7	1879	0.7	58.9	+ 17.2
Lynchburg, Va.	17	50.6	+ 11.6	46.0	1877	4.6	57.2	+ 11.2
Norfolk, Va.	19	51.4	+ 8.4	50.0	1879	1.4	59.1	+ 19.1
Charlotte, N. C.	12	54.7	+ 10.7	49.1	1879	5.6	60.6	+ 11.5
Hatteras, N. C.	10	54.6	+ 6.6	52.1	1881	2.5	61.2	+ 6.0
Kitty Hawk, N. C.	15	54.0	+ 9.0	53.1	1879	0.9	.....	.....
Wilmington, N. C.	19	56.0	+ 7.0	55.6	1879	0.4	62.8	+ 6.2
Charleston, S. C.	17	60.0	+ 9.0	57.9	1879	2.1	65.6	+ 5.6
Augusta, Ga.	17	57.4	+ 9.4	53.9	1879	3.5	64.5	+ 6.5
Savannah, Ga.	19	59.8	+ 6.8	58.5	1879	1.3	65.6	+ 7.1
Atlanta, Ga.	12	57.2	+ 13.2	50.9	1879	6.3	61.1	+ 10.1
Pensacola, Fla.	11	62.0	+ 8.0	58.5	1881	3.5	67.1	+ 6.6
Mobile, Ala.	19	61.0	+ 9.0	57.5	1875	3.5	66.4	+ 8.9
Montgomery, Ala.	18	59.1	+ 10.1	54.4	1875	4.7	65.3	+ 10.9
Vicksburg, Miss.	18	63.6	+ 13.6	56.5	1875	7.1	65.0	+ 8.5
New Orleans, La.	20	64.3	+ 9.3	61.6	1875	2.7	68.8	+ 10.5
Shreveport, La.	17	63.2	+ 13.2	55.3	1875	7.9	65.9	+ 10.6
Fort Smith, Ark.	6	57.8	.....	44.1	1883	13.7	61.6	+ 13.6
Little Rock, Ark.	11	59.1	+ 15.1	49.2	1881	9.9	61.8	+ 12.6
Galveston, Tex.	19	66.4	+ 9.4	61.5	1877	4.9	69.3	+ 7.8
Palestine, Tex.	8	64.2	.....	53.8	1883	10.4	66.2	+ 12.4
San Antonio, Tex.	11	66.0	+ 13.0	59.0	1879	7.0	67.8	+ 8.8
Brownsville, Tex.	15	71.1	+ 10.1	66.7	1879	4.4	73.0	+ 6.3
Rio Grande City, Tex.	12	71.2	+ 11.2	63.3	1879	7.9	73.6	+ 10.3
Chattanooga, Tenn.	11	57.2	+ 15.2	49.2	1879	8.0	60.4	+ 11.2